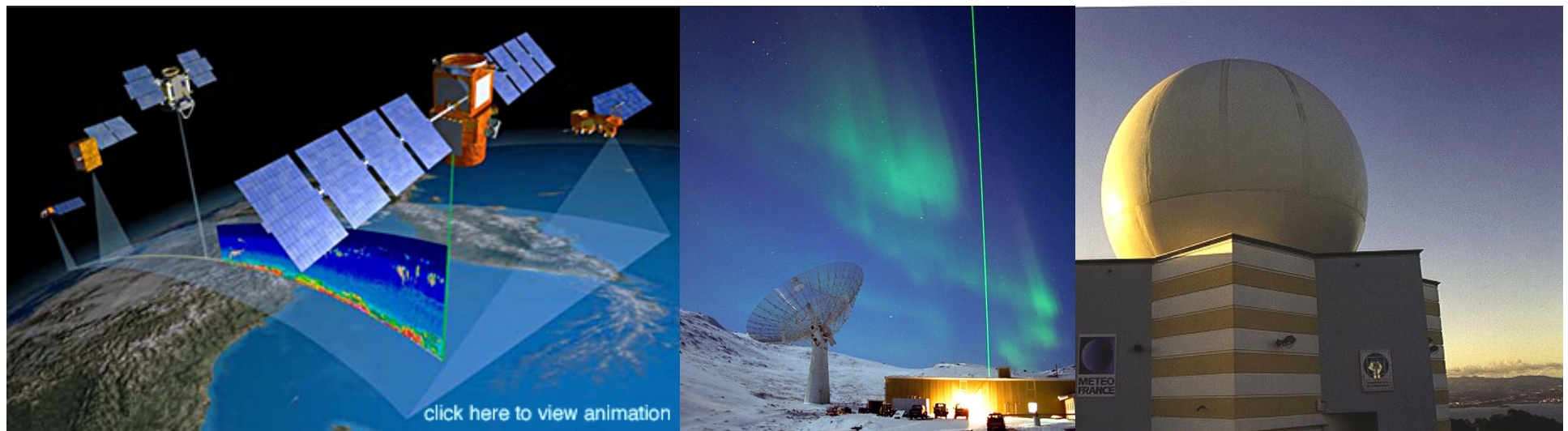
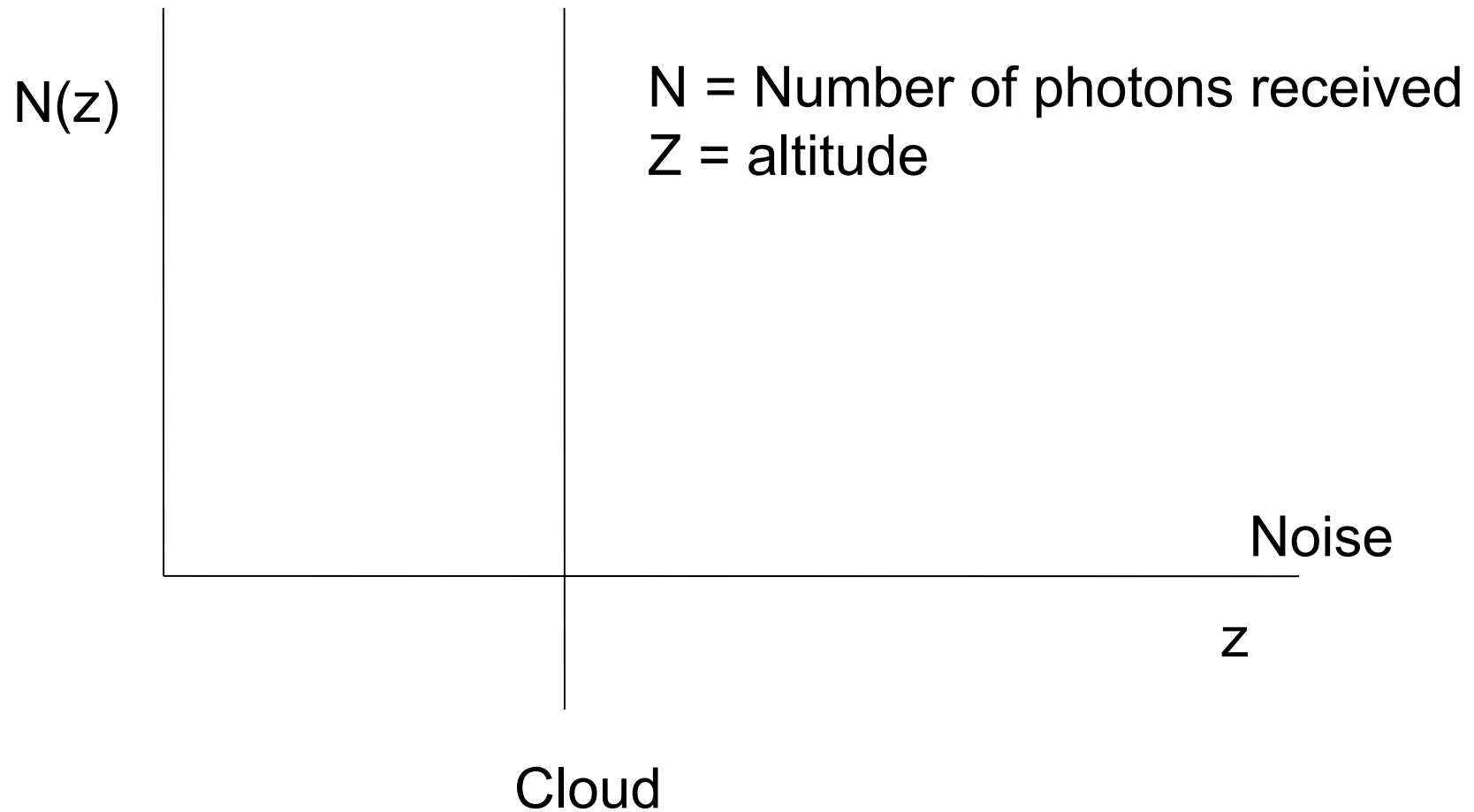


Remote Sensing and numerical modelling of the atmosphere

— Student restitution 2010/07/06 —



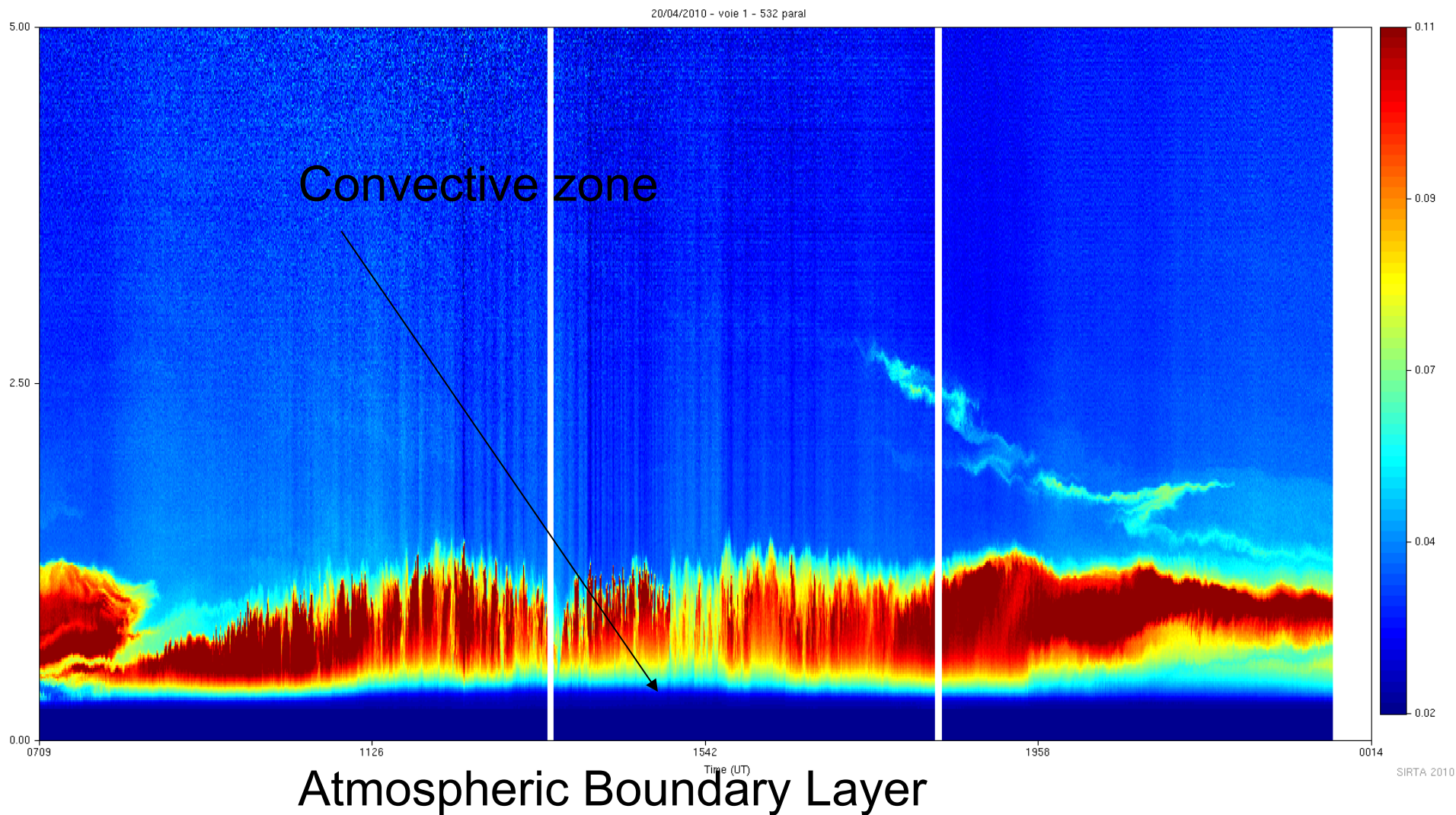
Measurement principle



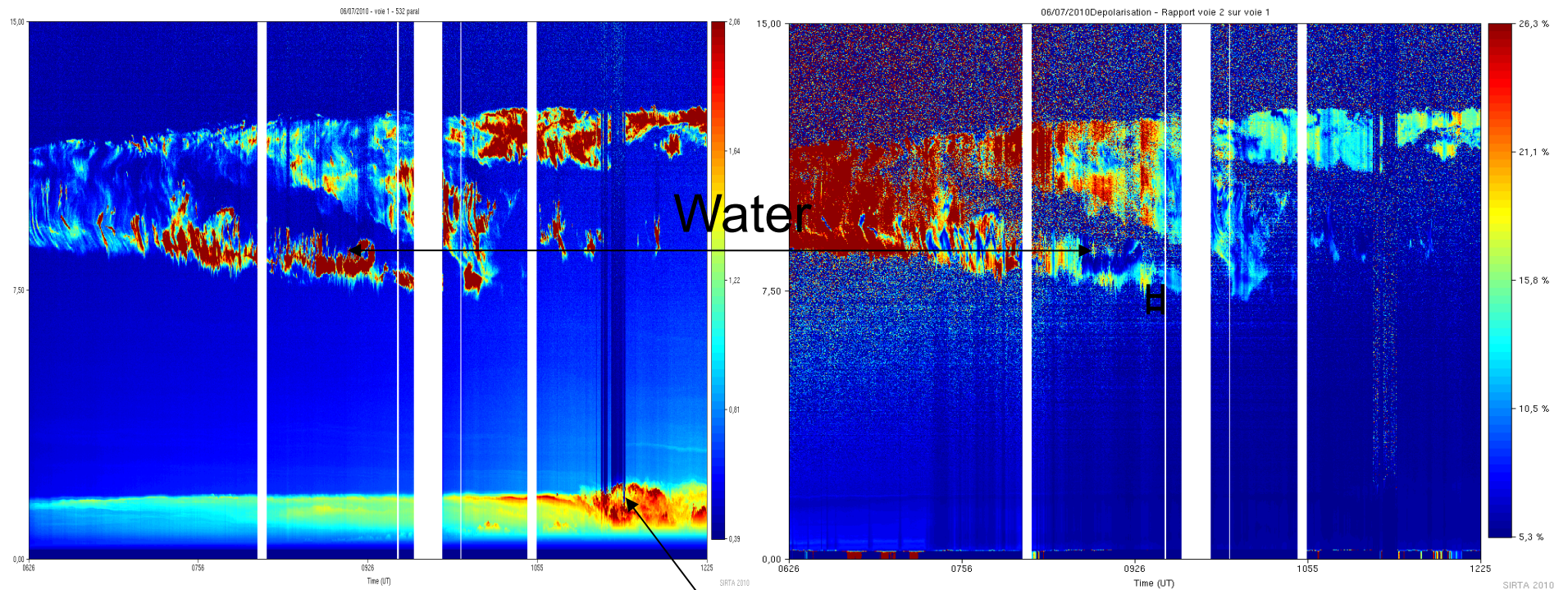
An example:
the SIRTA « aerosol and cloud » lidar system



Retrieval of atmospheric properties (1)

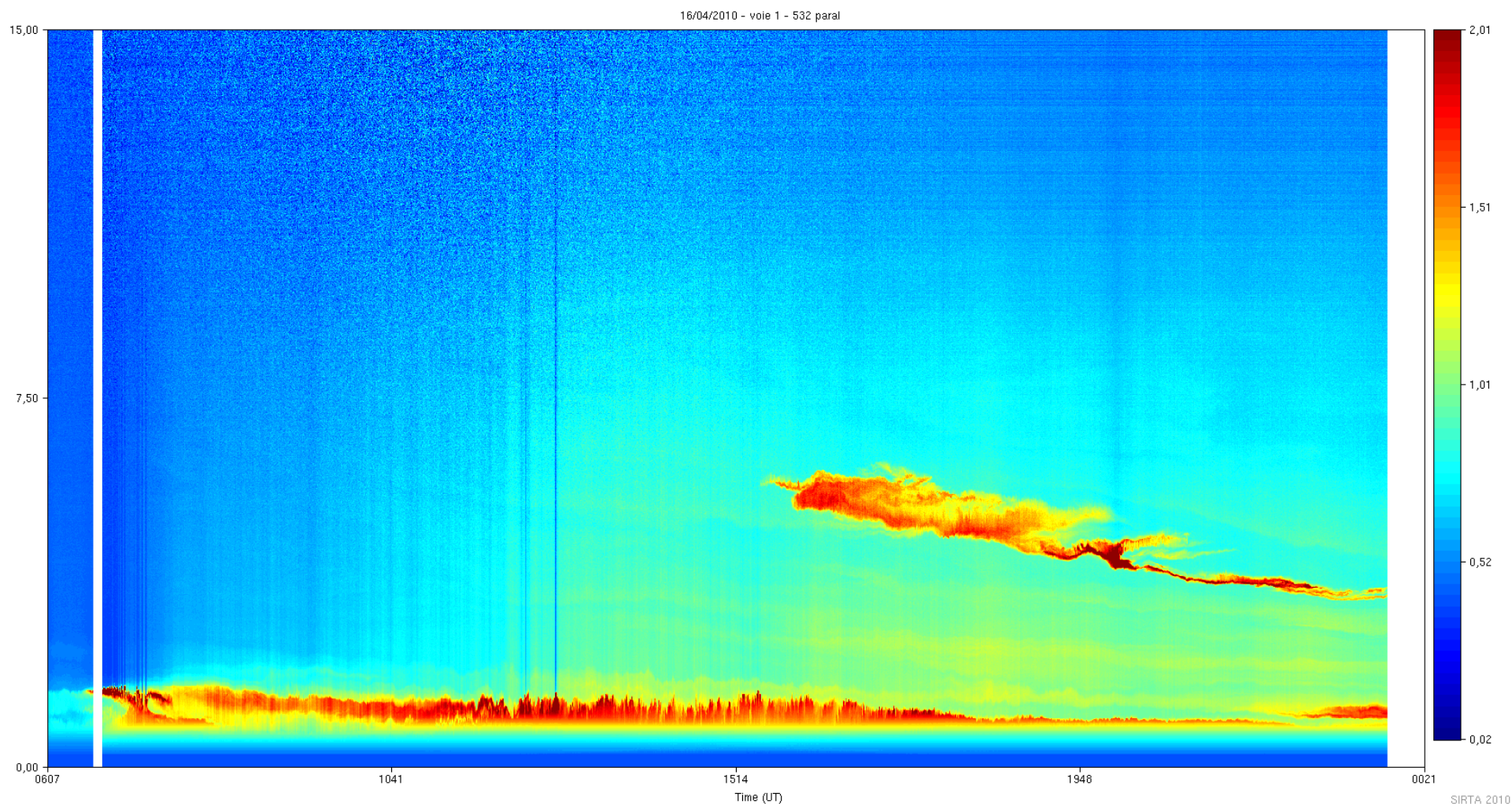


Retrieval of atmospheric properties (2)



Present Day

Retrieval of atmospheric properties (2)

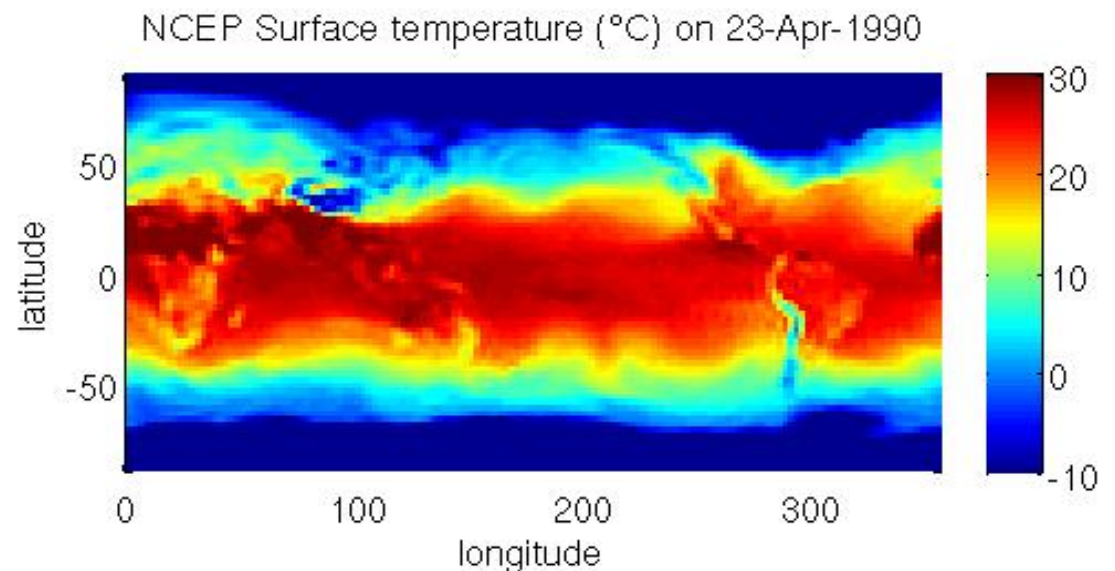
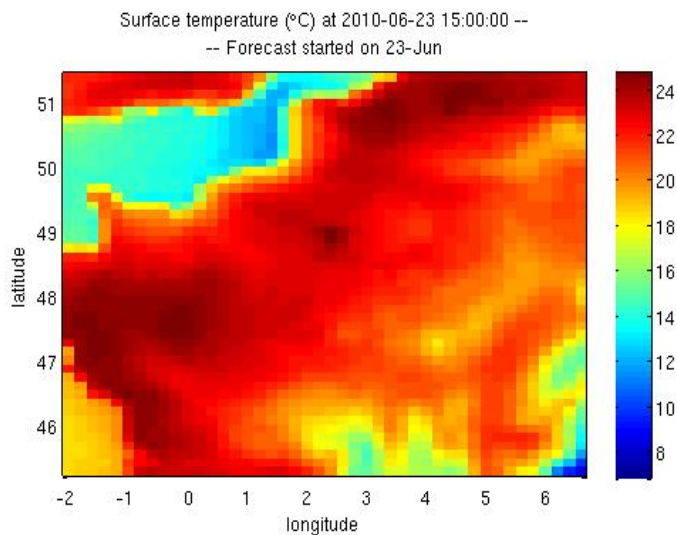


Ash cloud

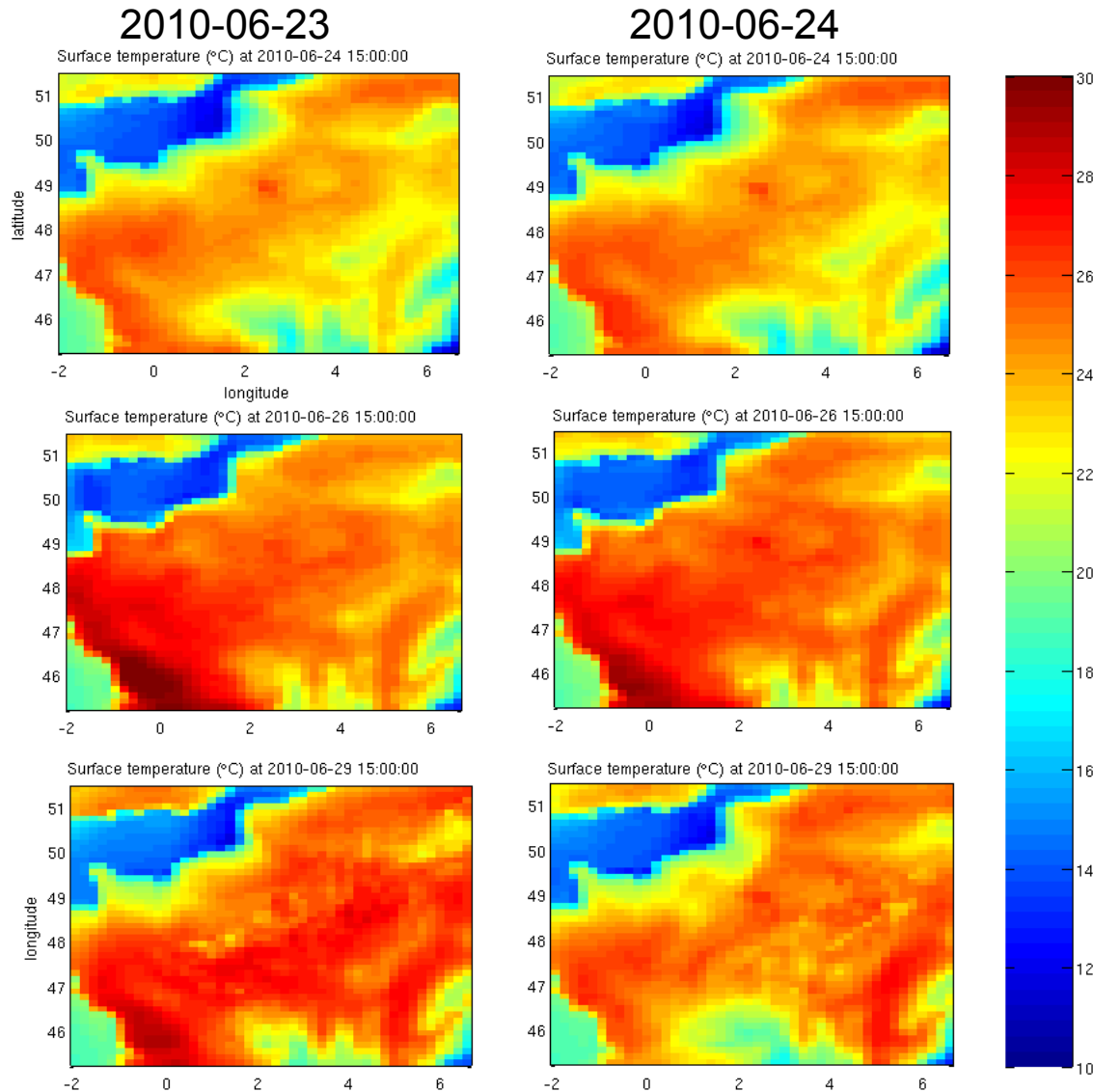
Various applications of remote sensing

- Wind
 - Temperature
 - Clouds
 - Aerosols / Pollution
 - Chemical species
-
- Vertical resolution
 - Thickness of clouds
 - Climate modelling
 - Weather forecast

- Weather Forecast model : sensitivity to initial conditions, resolution
- Climate model : how to compare it to observations



Determining surface temperature for different times of initialization

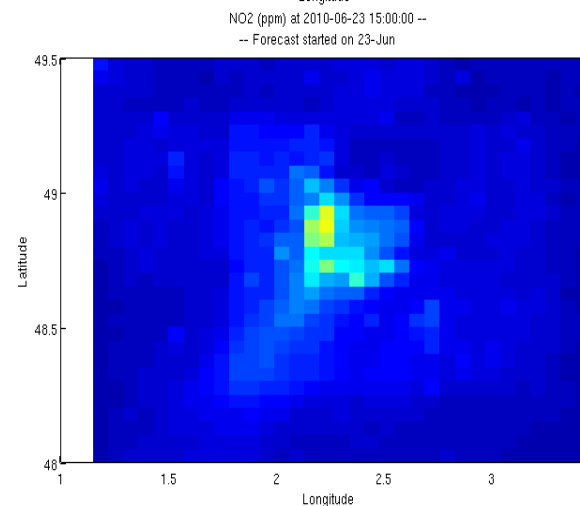
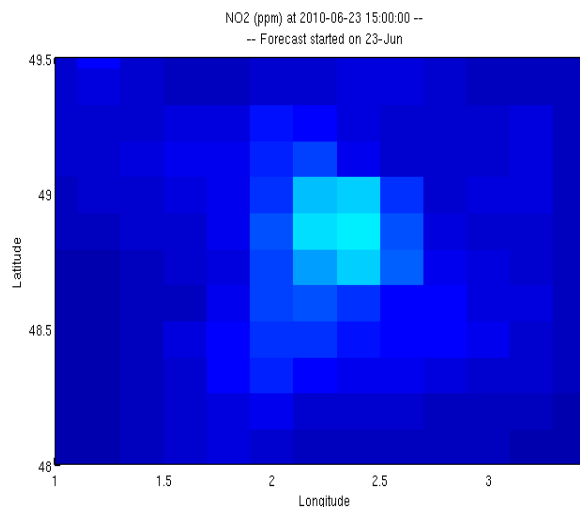


Initial maps
(2010-06-24) are
similar

The 5 day forecast
shows significant
discrepancies (for the
earth)

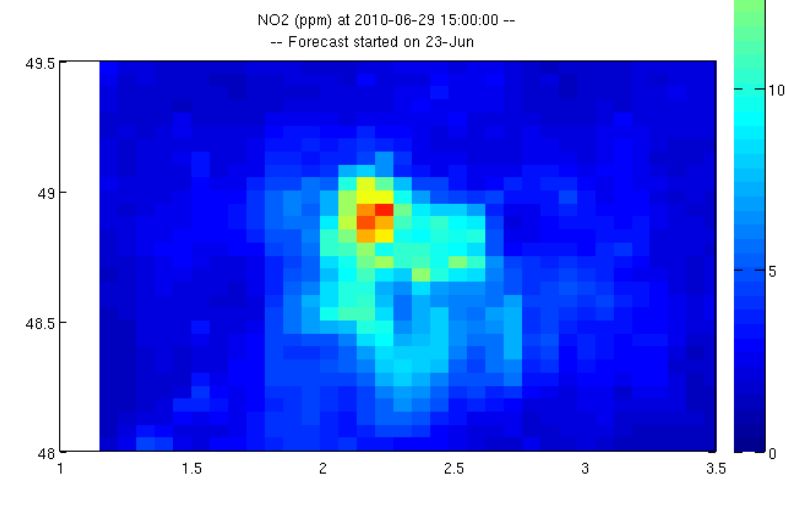
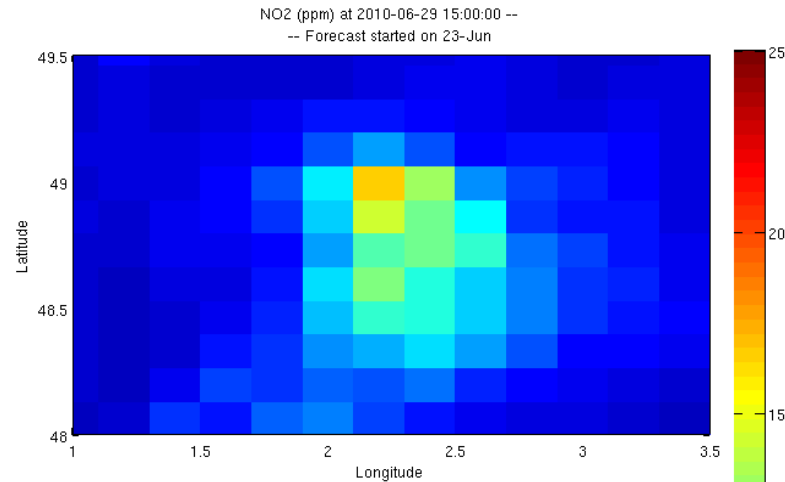
Sensitivity of the model to the resolution

2010-06-23



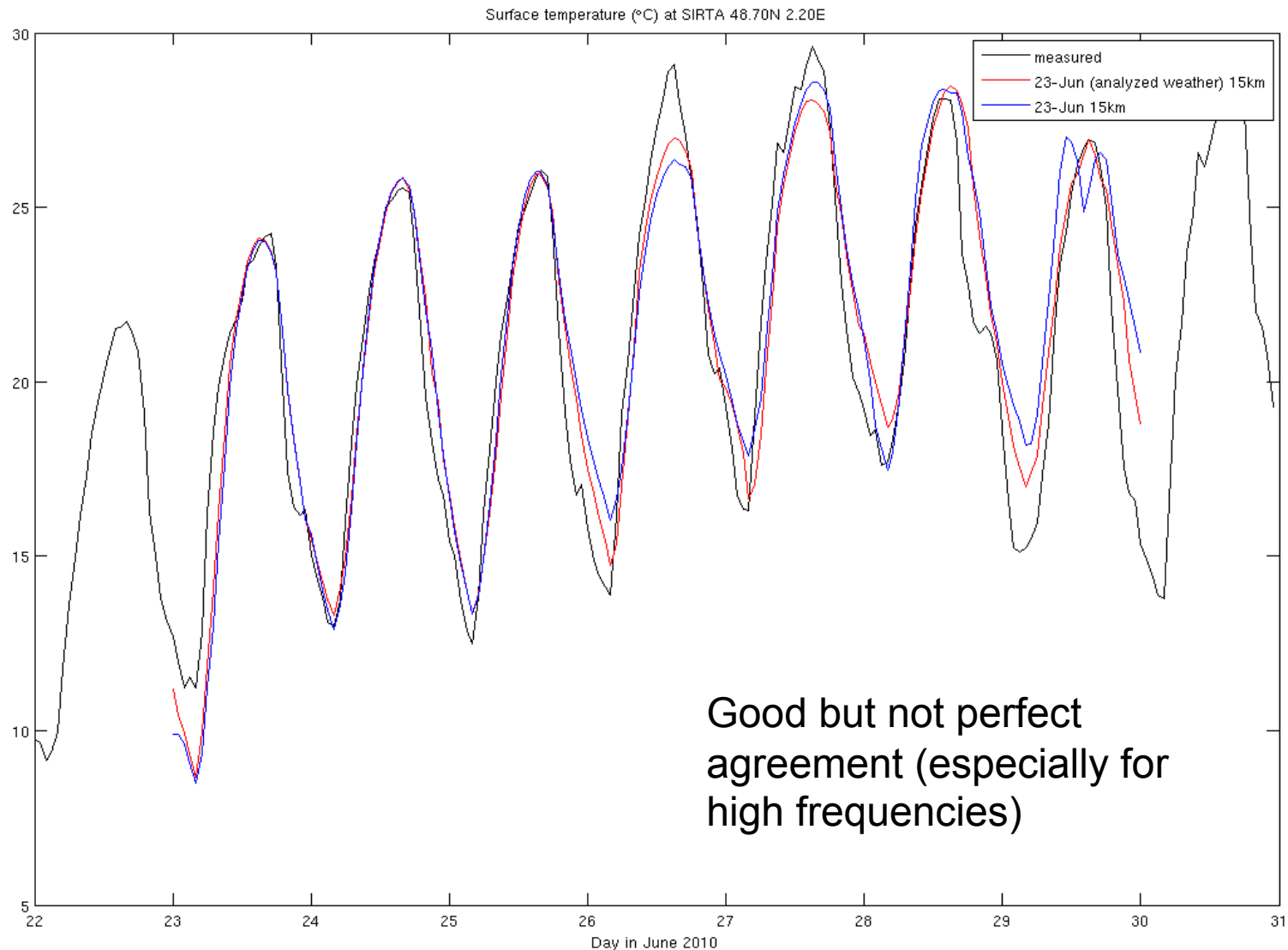
1st day: only smoothing effect

2010-06-29



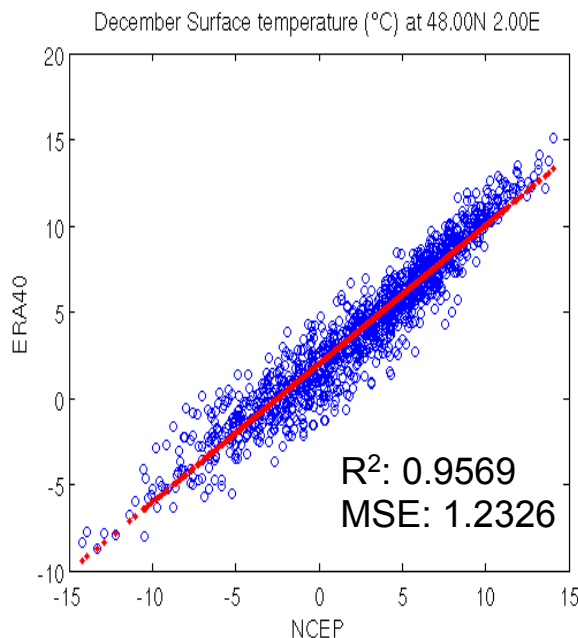
After 6 days: new discrepancies due to non-linear effects

Differences between measured and modeled quantities

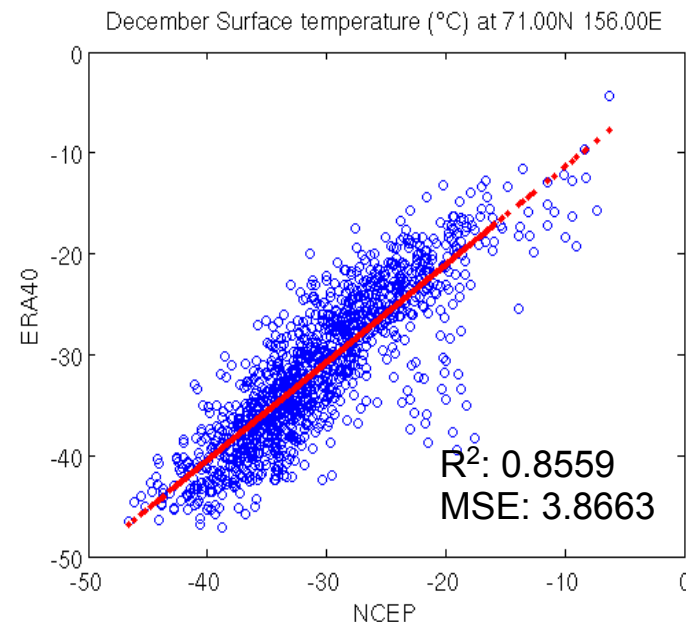


Model skill

A global weather forecast predicts the weather from initial conditions (precipitation, surface temperature, etc.), it works within a short range of time and it goes forward step by step. Weather forecasts really depend on the initial data and the density of measures.



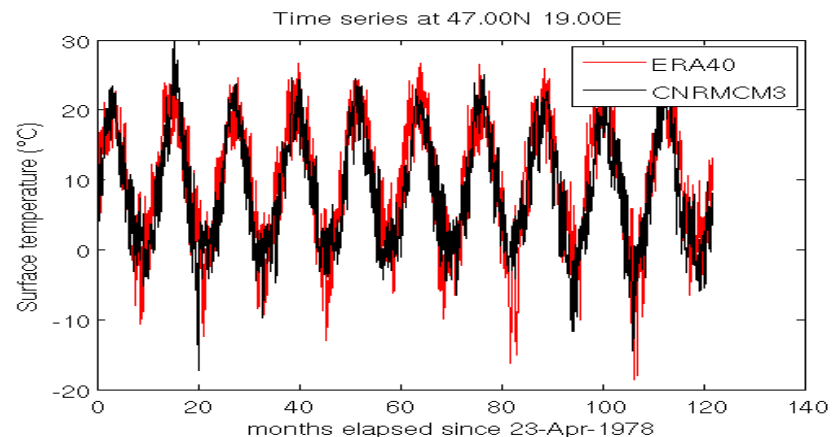
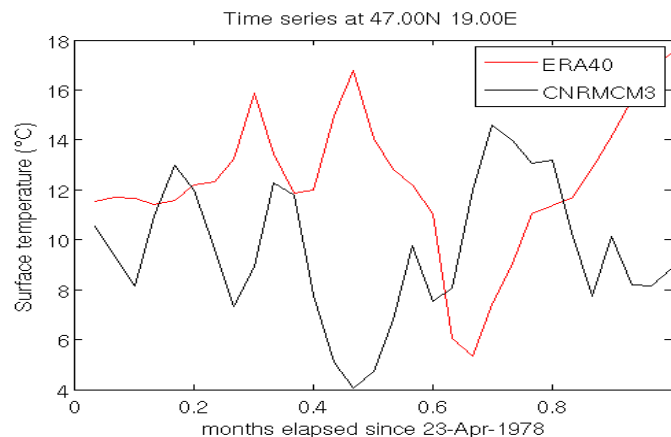
Paris, France



Barrow, Alaska

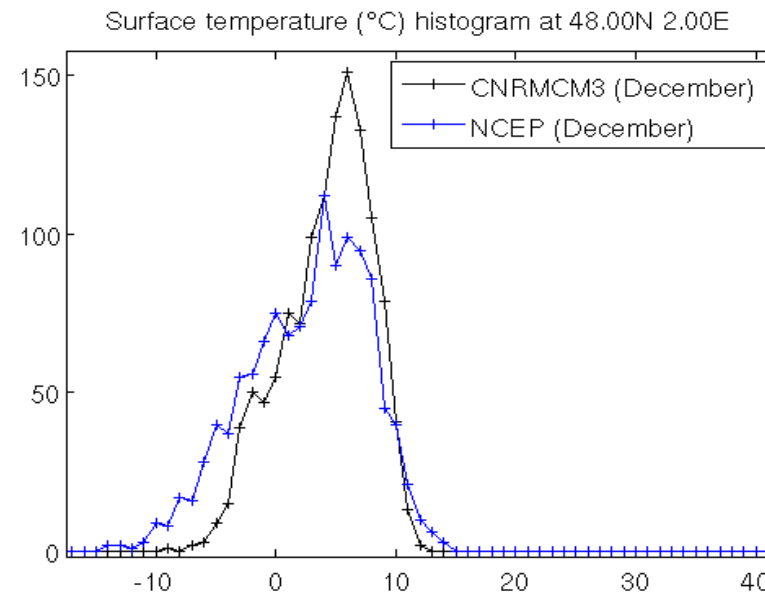
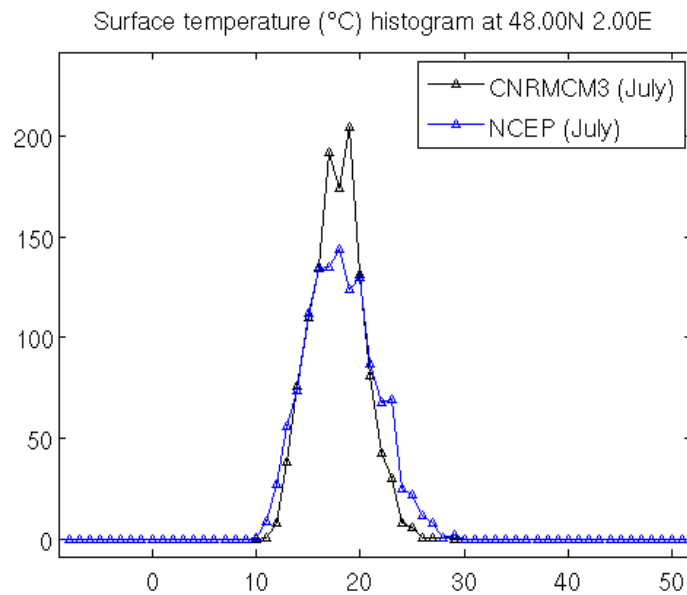
Model skill

The main difference between a weather forecasting model and a climate model is the time range: weather forecasts are predicting for two or three days, but climate models are for decades and annual cycles appear in them.



Model skill

The results of the climate model do not depend on the initial data, they are focused on the trends and periodical changes (like seasons).



Objectives

Analysis in order to determine the composition of the air.

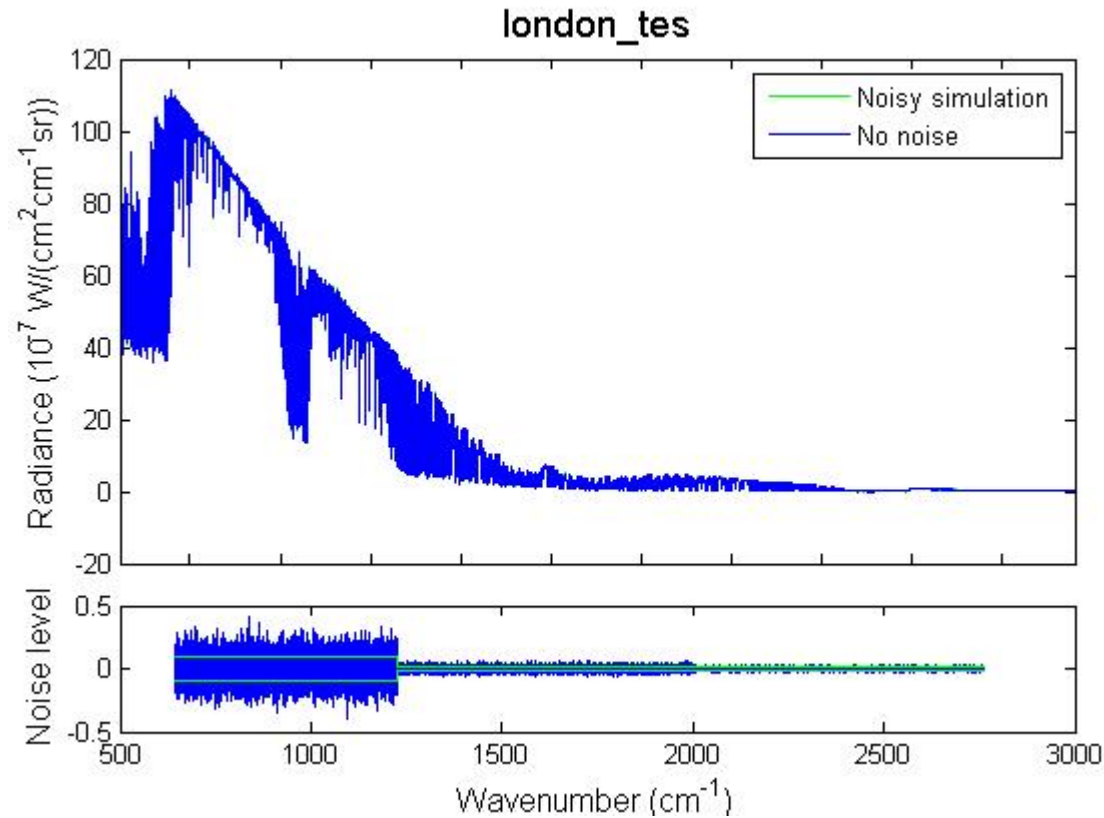
In order to:

- determine air quality
- improve weather forecasting

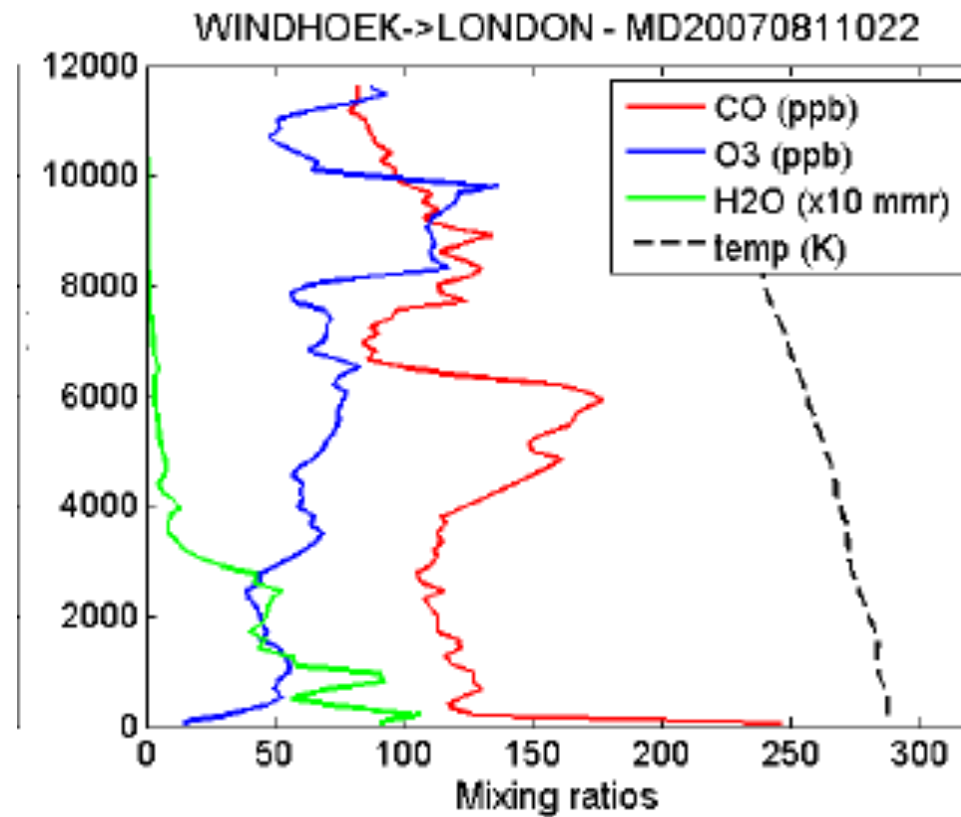
Determining the different ways a satellite can be used, in which way the data from a satellite can be interpreted and to try and understand the limitations

Results of the Observing System Simulation Experiment Results (2/2) vs black body

Total spectrum



Results of the Observing System Simulation Experiment Methodology



Results of the Observing System Simulation Experiment

Results (1/2)

